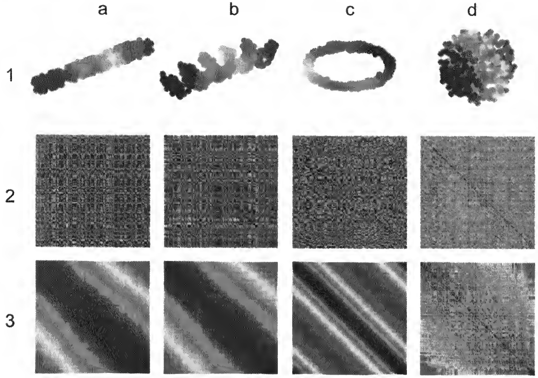


Fig. 1

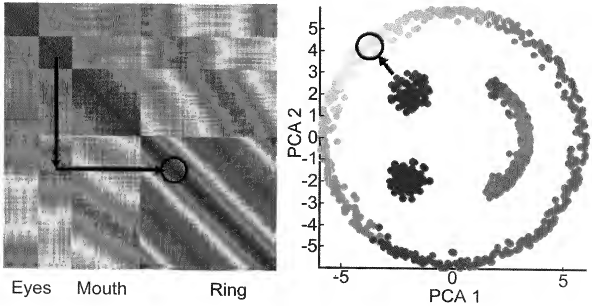


Fig. 2

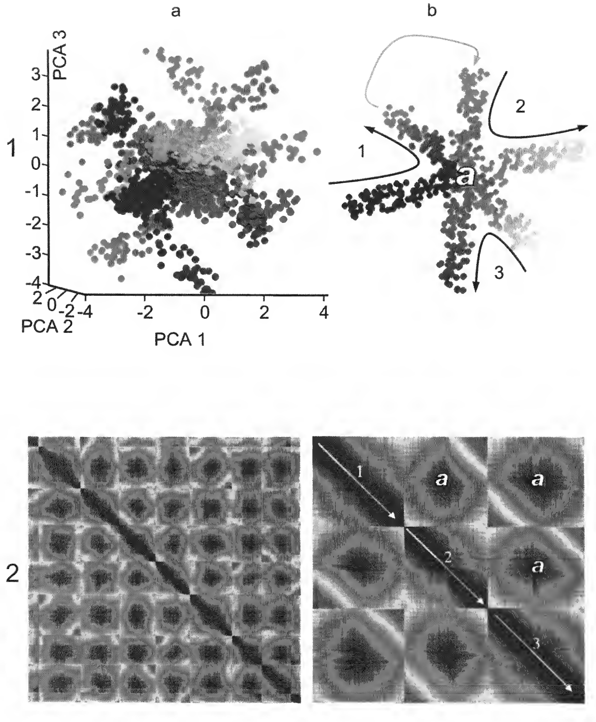
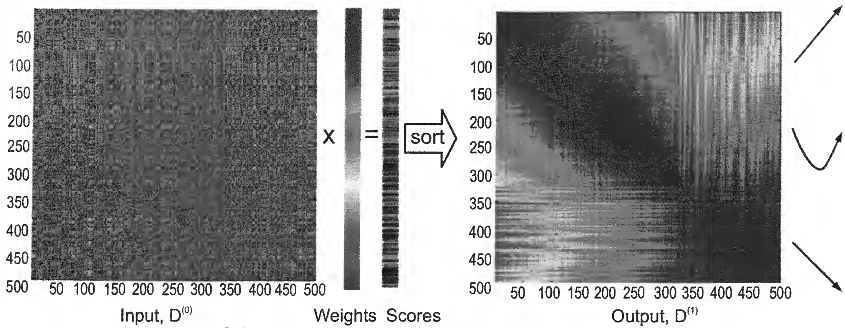


Fig. 3



Schematic representation of Side-to-side sorting

The initial unsorted distance matrix on the left is multiplied by a weight vector, resulting in a vector of scores. The weight vector's components increase linearly from -1 to 1. The points are then sorted according to their scores, generating a new permutation of the distance matrix, as shown on the right. This process is iterated until convergence, and the final outcome is shown at the right. By viewing the sorted matrix on the right it is readily apparent that the overall trend of the values in the upper rows is ascending, while the bottom rows have descending values, and intermediate rows have in-between values.

Fig. 4

Side-by-side

1. Define the weight vector $W_j = \dfrac{2j - N - 1}{N - 1}$

2. Calculate the scores vector $S_i^{(t)} = \sum_j D_{ij}^{(t)} W_j$

3. Sort the scores $\{k\}$ = index sort($\{Si\}$)

4. Reorder the distance matrix $D^{(t+1)} = D^{(t)}(\{k\},\{k\})$

5. Repeat steps 2-4 until $D^{(t+1)}$ is equal to $D^{(t)}$

Fig. 5

Results of Side-by-side Algorithm

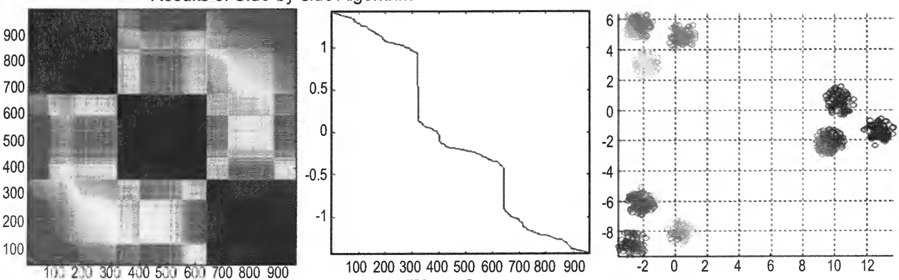


Fig. 6

Neighborhood Algorithm

1. Define the weight matrix $W_{ij} = e^{\frac{-(i-j)^2}{\varepsilon \cdot N}} \Big/ \sum_k e^{\frac{-(k-j)^2}{\varepsilon \cdot N}}$
2. Calculate the mismatch matrix $M_{ij}^{(t)} = \sum_k D_{ik}^{(t)} W_{kj}$
3. Extract score vector $\mathrm{S_i} = \arg\min_j (\mathrm{M_{ij}})$
4. Sort the scores {k} = index sort({Si})
5. Reorder the distance matrix $D^{(t+1)} = D^{(t)}(\{k\},\{k\})$
6. Repeat steps 1-5 while adjusting ε

Fig. 7

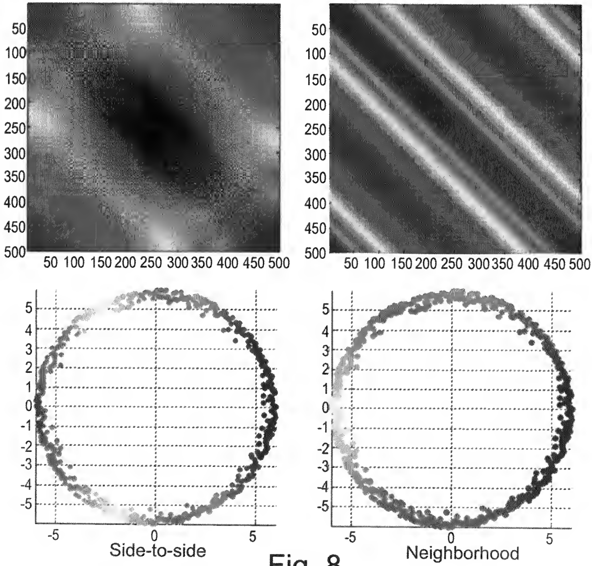


Fig. 8

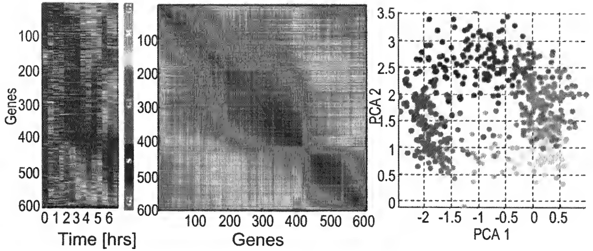

Genes
100
200
300
400
500
600
0 1 2 3 4 5 6
Time [hrs]
100 200 300 400 500 600
Genes
PCA 2
PCA 1
3.5
3
2.5
2
1.5
1
0.5
0
-2 -1.5 -1 -0.5 0 0.5

Fig. 9

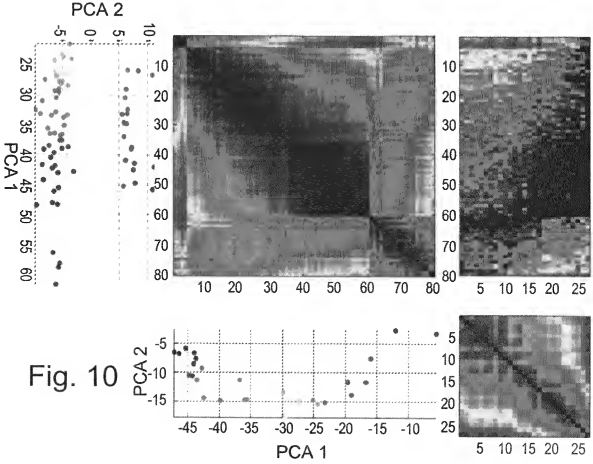

PCA 2
PCA 1
-5 0 5 10
25 30 35 40 45 50 55 60
10 20 30 40 50 60 70 80
5 10 15 20 25
-5
-10
-15
-45 -40 -35 -30 -25 -20 -15 -10

Fig. 10

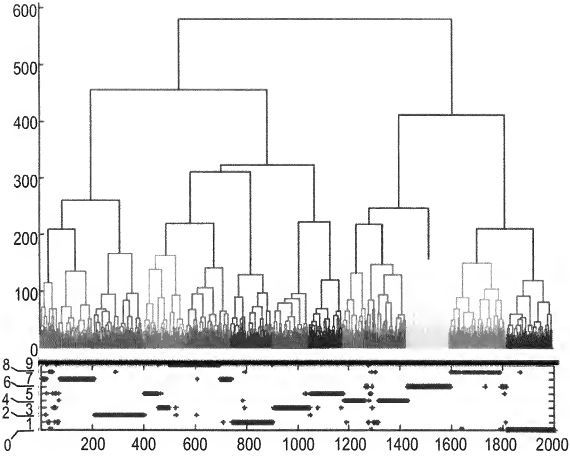

600
500
400
300
200
100
0
9
8
7
6
5
4
3
2
1
0
200
400
600
800
1000
1200
1400
1600
1800
2000

Fig. 11a

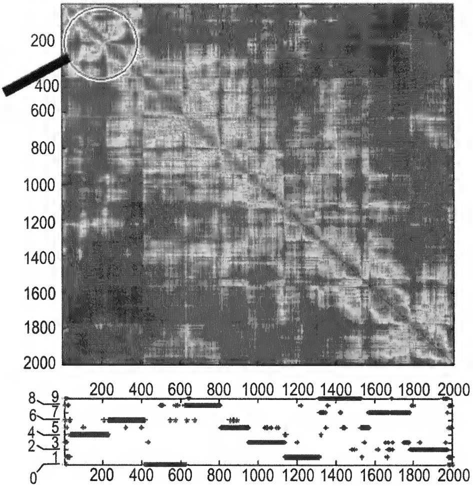


Fig. 11b

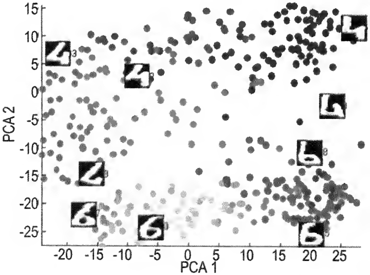


Fig. 11c

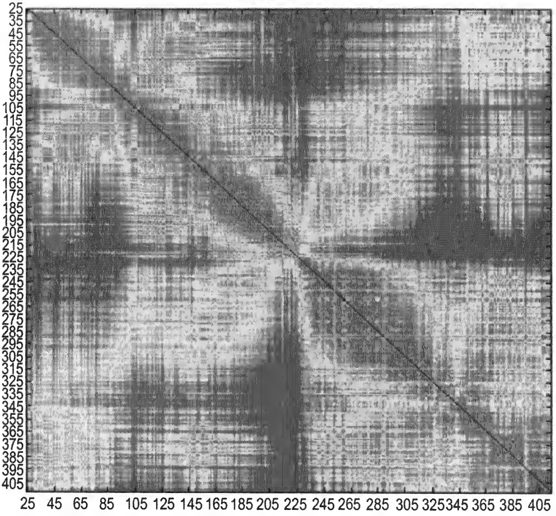


Fig. 11d

Fig. 11e

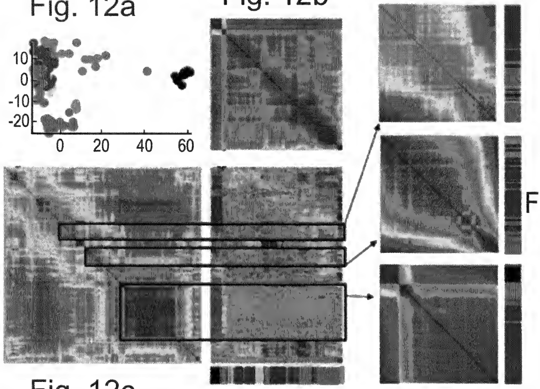


Fig. 12a

Fig. 12b

Fig. 12g

Fig. 12f

Fig. 12c

Fig. 12d

Fig. 12e